

1. Work requester fills out this section.

☐ Standing Work Permit

Requester: Don Lynch	Date: 12/9/05	Ext.: 2253	Dept/Div/Group: PO/Phenix
Other Contact person (if different from requester): Sal Marino			Ext.: 3704
Work Control Coordinator: Don Lynch		Start Date: 12/12/05	Est. End Date: 2/28/06 <u>06</u>
Brief Description of Work: Inspect and/or repair FEM's inside South Muon Magnet (MMS)			
Building: 1008	Room: IR	Equipment: n/a	Service Provider: PHENIX

WCC, Requester/Designee, Service Provider, and ES&H (as necessary) fill out this section or attach analysis

ES&H ANALYSIS				
Radiation Concerns		<input checked="" type="checkbox"/> None	<input type="checkbox"/> Activation	<input type="checkbox"/> Airborne
		<input type="checkbox"/> Contamination	<input type="checkbox"/> Radiation	
Radiation Generating Devices:		<input type="checkbox"/> Radiography	<input type="checkbox"/> Moisture Density Gauges	<input type="checkbox"/> Soil Density Gauges
		<input type="checkbox"/> X-ray Equipment		
<input type="checkbox"/> Special nuclear materials involved, notify Isotope Special Materials Group			<input type="checkbox"/> Fissionable materials involved, notify Laboratory Criticality Officer	
Safety Concerns		<input type="checkbox"/> None	<input type="checkbox"/> Ergonomics	<input type="checkbox"/> Transport of Haz/Rad Material
<input type="checkbox"/> Adding/Removing Walls or Roofs	<input checked="" type="checkbox"/> Confined Space*2A	<input type="checkbox"/> Explosives	<input type="checkbox"/> Lead*	<input type="checkbox"/> Penetrating Fire Walls
	<input type="checkbox"/> Corrosive	<input type="checkbox"/> Flammable	<input type="checkbox"/> Magnetic Field*	<input type="checkbox"/> Pressurized Systems
<input type="checkbox"/> Asbestos*	<input type="checkbox"/> Cryogenic	<input type="checkbox"/> Fumes/Mist/Dust*	<input type="checkbox"/> Material Handling	<input type="checkbox"/> Rigging/Critical Lift
<input type="checkbox"/> Beryllium*	<input type="checkbox"/> Electrical	<input type="checkbox"/> Heat/Cold Stress	<input type="checkbox"/> Noise*	<input type="checkbox"/> Toxic Materials*
<input type="checkbox"/> Biohazard*	<input type="checkbox"/> Elevated Work*	<input type="checkbox"/> Hydraulic	<input type="checkbox"/> Non-ionizing Radiation*	<input type="checkbox"/> Vacuum
<input type="checkbox"/> Chemicals*	<input type="checkbox"/> Excavation	<input type="checkbox"/> Lasers*	<input type="checkbox"/> Oxygen Deficiency*	<input type="checkbox"/> Other
* Does this work require medical clearance or surveillance from the Occupational Medicine Clinic? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
Environmental Concerns		<input checked="" type="checkbox"/> None	<input type="checkbox"/> Work impacts Environmental Permit No.	
<input type="checkbox"/> Atmospheric Discharges (rad/non-rad)	<input type="checkbox"/> Land Use	<input type="checkbox"/> Soil Activation/contamination	<input type="checkbox"/> Waste-Mixed	
<input type="checkbox"/> Chemical or Rad Material Storage or Use	<input type="checkbox"/> Liquid Discharges	<input type="checkbox"/> Waste-Clean	<input type="checkbox"/> Waste-Radioactive	
<input type="checkbox"/> Cesspools (UIC)	<input type="checkbox"/> Oil/PCB Management	<input type="checkbox"/> Waste-Hazardous	<input type="checkbox"/> Waste-Regulated Medical	
<input type="checkbox"/> High water/power consumption	<input type="checkbox"/> Spill potential	<input type="checkbox"/> Waste-Industrial	<input type="checkbox"/> Underground Duct/Piping	
Waste disposition by:		<input type="checkbox"/> Other		
Pollution Prevention (P2)/Waste Minimization Opportunity:		<input checked="" type="checkbox"/> None <input type="checkbox"/> Yes		
FACILITY CONCERNS		<input checked="" type="checkbox"/> None		
<input type="checkbox"/> Access/Egress Limitations	<input type="checkbox"/> Electrical Noise	<input type="checkbox"/> Potential to Cause a False Alarm	<input type="checkbox"/> Vibrations	
	<input type="checkbox"/> Impacts Facility Use Agreement	<input type="checkbox"/> Temperature Change	<input type="checkbox"/> Other	
<input type="checkbox"/> Configuration Control	<input type="checkbox"/> Maintenance Work on Ventilation Systems	<input type="checkbox"/> Utility Interruptions		
WORK CONTROLS				
Work Practices				
<input type="checkbox"/> None	<input type="checkbox"/> Exhaust Ventilation	<input checked="" type="checkbox"/> Lockout/Tagout Magnet	<input type="checkbox"/> Spill Containment	<input type="checkbox"/> Security (see Instruction Sheet)
<input checked="" type="checkbox"/> Back-up Person/Watch	<input type="checkbox"/> HP Coverage	<input type="checkbox"/> Posting/Warning Signs	<input type="checkbox"/> Time Limitation	<input type="checkbox"/> Other
<input type="checkbox"/> Barricades	<input type="checkbox"/> IH Survey	<input type="checkbox"/> Scaffolding-requires inspection	<input type="checkbox"/> Warning Alarm (i.e. "high level")	
Protective Equipment				
<input checked="" type="checkbox"/> None	<input type="checkbox"/> Ear Plugs	<input type="checkbox"/> Gloves	<input type="checkbox"/> Lab Coat	<input type="checkbox"/> Safety Glasses
<input type="checkbox"/> Coveralls	<input type="checkbox"/> Ear Muffs	<input type="checkbox"/> Goggles	<input type="checkbox"/> Respirator	<input type="checkbox"/> Safety Harness
<input type="checkbox"/> Disposable Clothing	<input type="checkbox"/> Face Shield	<input type="checkbox"/> Hard Hat	<input type="checkbox"/> Shoe Covers	<input type="checkbox"/> Safety Shoes <input type="checkbox"/> Other
Permits Required (Permits must be valid when job is scheduled.)				
<input checked="" type="checkbox"/> None	<input type="checkbox"/> Cutting/Welding	<input type="checkbox"/> Impair Fire Protection Systems		
<input type="checkbox"/> Concrete/Masonry Penetration	<input type="checkbox"/> Digging/Core Drilling	<input type="checkbox"/> Rad Work Permit-RWP No		
<input type="checkbox"/> Confined Space Entry	<input type="checkbox"/> Electrical Working Hot	<input type="checkbox"/> Other		
Dosimetry/Monitoring				
<input checked="" type="checkbox"/> None	<input type="checkbox"/> Heat Stress Monitor	<input type="checkbox"/> Real Time Monitor	<input type="checkbox"/> TLD	
<input type="checkbox"/> Air Effluent	<input type="checkbox"/> Noise Survey/Dosimeter	<input type="checkbox"/> Self-reading Pencil Dosimeter	<input type="checkbox"/> Waste Characterization	
<input type="checkbox"/> Ground Water	<input type="checkbox"/> O ₂ /Combustible Gas	<input type="checkbox"/> Self-reading Digital Dosimeter	<input type="checkbox"/> Other	
<input type="checkbox"/> Liquid Effluent	<input type="checkbox"/> Passive Vapor Monitor	<input type="checkbox"/> Sorbent Tube/Filter Pump		
Training Requirements (List below specific training requirements)				
PHENIX Awareness, Confined Space (for working in the magnet, Aerial lift (for driving the aerial lift), working at heights and fall protection equipment (for driving or riding in the aerial lift)				
Based on analysis above, the Walkdown Team determines the risk, complexity, and coordination ratings below:			If using the permit when all hazard ratings are low, only the following need to sign: (Although allowed, there is no need to use back of form)	
ES&H Risk Level:	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Moderate	<input type="checkbox"/> High	WCC: _____ Date: _____
Complexity Level:	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Moderate	<input type="checkbox"/> High	Service Provider: _____ Date: _____
Work Coordination:	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Moderate	<input type="checkbox"/> High	Authorization to start _____ Date: _____
(Departmental Sup/WCC/Designee)				

3. Both work requester and service provider contribute to work plan (use attachments for detailed plans)

Work Plan (procedures, timing, equipment, and personnel availability need to be addressed): See Attached				
Special Working Conditions Required: None				
Operational Limits Imposed: None				
Post Work Testing Required: No				
Job Safety Analysis Required: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Walkdown Required: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Reviewed by: Primary Reviewer will determine the size of the review team and the other signatures required based on hazards and job complexity. Primary Reviewer signature means that the hazards and risks that could impact ES&H have been identified and will be controlled according to BNL requirements.				
Title	Name (print)	Signature	Life #	Date
Primary Reviewer				
ES&H Professional				
Other				
Other				
Work Control Coordinator				
Service Provider				
Review Done: <input type="checkbox"/> in series <input type="checkbox"/> team				

4. Job site personnel fill out this section.

Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including any attachments).			
Job Supervisor:		Contractor Supervisor:	
Workers:	Life#:	Workers :	Life#:
Workers are encouraged to provide feedback on ES&H concerns or on ideas for improved job work flow. Use feedback form or space below.			

5. Departmental Job Supervisor, Work Control Coordinator/Designee

Conditions are appropriate to start work: (Permit has been reviewed, work controls are in place and site is ready for job.)			
Name:	Signature:	Life#:	Date:

6. Departmental Job Supervisor, Work Requester/Designee determines if Post Job Review is required. ☐ Yes ☐ No

Post Job Review (Fill in names of reviewers)			
Name:	Signature:	Life#:	Date:
Name:	Signature:	Life#:	Date:

7. Worker provides feedback.

Worker Feedback (use attached sheets as necessary)	
a) WCMWCC: Is any feedback required? <input type="checkbox"/> Yes <input type="checkbox"/> No	
b) Workers: Are there better methods or safer ways to perform this job in the future? <input type="checkbox"/> Yes <input type="checkbox"/> No	

8. Closeout: Work Control Coordinator (authorizing dept.) checks quality of completed permit and ensures the work site is left in an acceptable condition. (WCC can delegate clean up of work area to work supervisor)

Name:	Signature:	Life#:	Date:
Comments:			

Repair and/or replace FEM's inside South Muon Magnets in PHENIX IR, Bldg. 1008

South and North Muon Magnet Confined Space Entry – Class 2A: Enter the South Muon Magnet (MMS) in the experimental hall and (A) inspect for water and (B) repair/replace electronic modules (FEM Cards) as required. The detector chambers inside the MMS contain inert gas (N_2). Hazardous Atmosphere Testing is not required. The hazards are that entry is made via ladder (MMS) through an opening created by removing the east vertical lampshade about 11 feet above track level and the magnet has a sloping floor (35 to 40 degree from vertical) which may present the danger of a slip/fall (about 6 feet elevation change down sloping floor). The FEM Cards which currently require repair/replacement are all accessible from an external articulated manlift and internal access is required only for inspection, unless after such inspection it is determined that internal repairs are necessary as well. The inspection will be accomplished without installing any internal steps, as adequate support from structural elements is within reach. Should internal repairs be deemed necessary, however, more stable access to work surfaces is provided by installing “steps” on the sloping floor. At all times adherence to the PHENIX “two person” rule is required: when the magnet is occupied, two people must be present and within talking distance at all times.

This work is to be done by fully trained and experienced PHENIX personnel, under the supervision of Sal Marino. A properly executed and signed Confined Space Entry (CSE) Certification is required prior to entry.

Procedure

LOTO the power to the magnet coil at the power supply in 1008B. Remove the east/vertical lampshade and the lampshade immediately above it. (Pearson)

Verify that no gas is flowing to the chambers. (Biggs)

Secure a ladder to the east side of the MMS. For the MMN provide a step ladder to enter via the hatch. (Marino)

Enter either magnet and inspect for water intrusion; if any is found then install the pre-fabricated steps on the lower east lampshade panel (MMS and MMN) working from the bottom up. If access is required to any west side electronics the stairs to that side will also be installed. Work is limited to the bottom three sectors of stations 2 and 3 and the lower crates of the vertical sectors that may be easily reached from the steps. (Marino, MuTr experts)

If Necessary, enter the magnet and remove/repair/replace FEM components. When one person enters the other will provide backup watch at the entry opening/hatch. (MuTr experts) (Marino, MuTr experts)

After the internal repairs (if required) are completed, perform the repairs on FEM Cards accessible from the exterior via the articulated manlift. Note: only properly trained PHENIX technicians may operate the manlift and passengers in the manlift must have appropriate training in fall protection and working at heights in order to be qualified to work from the manlift. (Marino, MuTr experts)

Once work is complete, remove the internal steps, sweep the magnet interior for tools and personnel and remove the external access ladder. (Marino, MuTr experts)

Reinstall the MMS lampshades per CA Procedure (Pearson)

Remove LOTTO on magnet power supply. (Pearson)

CONFINED SPACE ENTRY CERTIFICATION

Location Building 1008, IR, Muon Magnet South (MMS)		Date
Department PO	Division PHENIX	
Building 1008	Area/Location/Room: IR, MMS	
Supervisor/Designee Don Lynch/SalMarino		Life # 20146/15767

PRE-ENTRY QUESTIONS

For each item, check "yes" or "no": If no, consult Supervisor

	YES	NO
Is entry essential to perform work?	<input type="checkbox"/>	<input type="checkbox"/>
Have all personnel been trained in confined space entry?	<input type="checkbox"/>	<input type="checkbox"/>
Are conditions safe to remove utility-hole cover?	<input type="checkbox"/>	<input type="checkbox"/>
Has opening been guarded?	<input type="checkbox"/>	<input type="checkbox"/>
Is monitoring equipment calibrated?	<input type="checkbox"/>	<input type="checkbox"/>
Has monitoring been performed and recorded below?	<input type="checkbox"/>	<input type="checkbox"/>
Is GFCI used, if outside or in wet conditions?	<input type="checkbox"/>	<input type="checkbox"/>
Is ventilation blown into bottom of space? (If required)	<input type="checkbox"/>	<input type="checkbox"/>
Are personnel instructed to evacuate upon hazard detection?	<input type="checkbox"/>	<input type="checkbox"/>
Have all workers reviewed these entry requirements?	<input type="checkbox"/>	<input type="checkbox"/>
Radiation: If present, RWP may be required – review work with ESH Coordinator and RCD personnel. Evaluate hazards and controls.	<input type="checkbox"/> Reviewed	<input type="checkbox"/>

SPACE CLASSIFICATION QUESTIONS

For each item, check box only if "yes"

	Class 2A	Class 2B	Class 2C
Engulfment Hazard Present			<input type="checkbox"/>
Entrapment Hazard Present			<input type="checkbox"/>
Electrical Systems:			
• Deenergized	<input type="checkbox"/>		
• Energized and Working Hot			<input type="checkbox"/>
• Energized, but Guarded or not Working Hot	<input type="checkbox"/>		
Mechanical Systems:			
• Deenergized	<input type="checkbox"/>		
• Energized and Working Hot			<input type="checkbox"/>
• Energized but Guarded or not Working Hot	<input type="checkbox"/>		
Other Energized Systems: (e.g., steam, sewage)			
• Deenergized	<input type="checkbox"/>		
• Energized and Working Hot			<input type="checkbox"/>
• Energized but Guarded or not Working Hot	<input type="checkbox"/>		
Chemical Hazards inherent in space, based upon monitoring, but controllable by ventilating		<input type="checkbox"/>	
Chemical Hazards inherent in space, based upon monitoring, but not controllable by ventilating			<input type="checkbox"/>
Chemical Sources, introduced into space? (e.g., welding fumes, solvents)			<input type="checkbox"/>
High Temperature/Pressure Hazard? (other than steam utility-holes)			<input type="checkbox"/>
<ul style="list-style-type: none"> If ANY box in column 2C is checked, a Confined Space Permit IS required. If any box in column 2B is checked, and none in column 2C, a Confined Space Permit IS NOT required BUT continuous monitoring and ventilating ARE required. If only boxes in column 2A are checked, no additional requirements apply. 			

Classification evaluation

CLASSIFICATION	<p>I have completed the front and back of this Confined Space Entry Certification form and classified this space. If the confined space is classified as a 2C, I will obtain a Confined Space entry permit. If the space is Class 2B, continuous monitoring and ventilation is required and will be documented on this form.</p>	
CLASS:2A	Supervisor/Designee:	Life #
		Date:

BNL CONFINED SPACE ENTRY CERTIFICATION

Meter:	Serial #	Calibration Date:
Day of Use Sensor Check <input type="checkbox"/> Yes <input type="checkbox"/> No		
Tested By:		BNL#:

MONITORING RESULTS

Tested By:		BNL Number:			
Date/ Time	Oxygen % (% O ₂)	Flammable Gas (% LEL)	Carbon Monoxide (CO ppm)	Hydrogen Sulfide (H ₂ S ppm)	Other:
Pre-Entry Certification test					
Acceptable Reading	19.5 – 23.5 %	< 10 % of LEL	<25 ppm	<10 ppm	

Supplemental sampling record

CLASS 2B CONFINED SPACE ENTRY CERTIFICATION

For Class2B spaces, continuous monitoring is required.

MONITORING RESULTS

Tested By:		BNL Number:			
Date/ Time	Oxygen % (% O ₂)	Flammable Gas (% LEL)	Carbon Monoxide (CO ppm)	Hydrogen Sulfide (H ₂ S ppm)	Other:
Acceptable Reading	19.5 – 23.5 %	< 10 % of LEL	25 ppm	10 ppm	

Class 2B: Describe Method of Ventilation:

Muon Magnet Confined Space Entry Certification Sheet

*The undersigned certify that they have taken the BNL Confined Space Training, BNL Course # **HP-OSH-016**, within the last twelve months, and understand the hazards involved in working in the south and north muon magnets (**MMS and MMN**).*

[illegible]

Muon Magnet Confined Space Entry certification Sheet.

The undersigned certify that they have taken the BNL Confined Space Training within the last twelve months, and understand the hazards involved in working inside the south and north muon magnets (MMS and MMN).

[illegible]